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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,709	12/27/2001	Migaku Takahashi	OSP-11676	9206

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EXAMINER	
BERNATZ, KEVIN M	
ART UNIT	**PAPER NUMBER**
1773	9

DATE MAILED: 10/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/026,709	TAKAHASHI ET AL.	
	Examiner	Art Unit	
	Kevin M Bernatz	1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-13,17 and 19-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-13,17 and 19-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. Amendments to the specification and claims 1 and 20 - 24, filed on August 15, 2003, have been entered in the above-identified application.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Examiner's Comments

4. Claim 4 is confusing since claim 1 requires that the underlayer be either Cr, or a Cr alloy incorporating Mo and/or W, yet claim 4 now recites that the underlayer is "either one of Cr and a Cr alloy, and said Cr alloy incorporates one or two or more elements ..." wherein W and Mo are /not/ listed. The Examiner has interpreted this claim to require the underlayer to either by Cr, or a Cr alloy comprising Mo and/or W (from claim 1) ***and*** 1 or more elements from the Markush group listed in claim 4 (i.e. at least a ternary Cr alloy such as CrMoX or CrWX, where X are the additive elements listed in claim 4).

5. Claim 21 is confusing because the language "a ferromagnetic metal layer .. on top of said non-magnetic base material *and said ferromagnetic metal layer so that said*

metal underlayer disposed between said base material and said ferromagnetic metal layer, wherein,". The Examiner has interpreted this claim to read "a ferromagnetic metal layer ... on top of said non-magnetic base material and said metal underlayer so that said metal underlayer is disposed ...".

Claim Rejections - 35 USC § 102

Claim Rejections - 35 USC § 103

6. Claims 1, 2, 4 - 13, 17 and 19 - 24 are rejected ***under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over*** Malhotra et al. ('217 B1) in view of the following evidentiary art: Ikeda et al. (IEEE Trans. Mag., 33(5), 1997, 3079 - 3081), Akimoto et al. ('736 A1), Bertero et al. ('567), Howard ('499) and Takahashi et al. ('847).

Regarding claims 1 and 21, Malhotra et al. disclose a magnetic recording medium comprising a non-magnetic base material (*Figure 1 – element 12*) and a ferromagnetic metal layer of a cobalt based alloy (*Element 16 and Table 1*) formed on top of said non-magnetic base material with a metal underlayer disposed between said base material and said ferromagnetic metal layer (*Elements 14 and 15*), wherein a coercive force He is at least 2000 Oe (*Table 1*), wherein said metal underlayer incorporates an underfilm of either one of Cr and a Cr alloy, and said Cr alloy also incorporates Mo and/or W (*col. 2, lines 8 – 12*)..

Malhotra et al. fail to disclose the anisotropic magnetic field of the recording medium being at least 10,000 Oe at the same time the coercivity is at least 2000 Oe.

The Examiner notes that in the instant case the claimed and prior art products are substantially identical in both structure and composition (*e.g. Table 1 – $Co_{74}Cr_{17}Ta_4Pt_5$ alloy magnetic layer over $CrMo_{20}$/Cr dual underlayer*). Therefore, in addition to the above disclosed limitations, the presently claimed property of "an anisotropic magnetic field Hk^{grain} is at least 10,000 Oe" is deemed to have inherently been present because the claimed and prior art products are substantially identical in both structure and composition.

However, even in the case where the claimed anisotropic magnetic field may not be inherently present, the Examiner notes that it would have still been obvious to one of ordinary skill in the art to optimize the anisotropic field to a large value meeting applicants' claimed limitations inorder to avoid write demagnetization (*as evidenced by Ikeda et al. – Sections III and IV and Figure 2*), to increase the coercivity (*as evidenced by Bertero et al. – col. 10, lines 21 – 24; col. 11, lines 28 – 32 where Ku is proportional to Hk; and col. 20, line 60 bridging col. 21, line 11*) and/or to control the normalized coercive force (Hc/Hk^{grain}) inorder to produce a low noise medium capable of high recording densities (*as evidenced by Takahashi et al. – col. 25, lines 9 – 13*).

Therefore, the Examiner deems that even in the case where the anisotropic magnetic field may not inherently meet applicants' claimed limitations it would have still been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the anisotropic magnetic field through

routine experimentation, especially given the knowledge in the art noted above regarding the effect of the anisotropic magnetic field on the write demagnetization properties, the transitional position of the magnetic layer and the noise of the recording medium. *In re Boesch*, 205 USPQ 215 (CCPA 1980), *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Regarding claim 2, the limitation "wherein said metal underlayer and said ferromagnetic metal layer are formed in a film fabrication chamber with an ultimate vacuum at a 10^{-9} Torr level, using a film fabrication gas with an impurity concentration of no more than 1 ppb" is a product-by-process limitation and is not further limiting in so far as the structure of the product is concerned. In the instant case, the claimed and prior art products are deemed substantially identical since both the claimed and prior art are substantially identical in both structure and composition (i.e. a Co-alloy magnetic layer over a $CrMo_{20}$/Cr dual underlayer).

Regarding claims 4 – 13, 19, 20 and 22 - 24, Malhotra et al. disclose underlayers and ferromagnetic layers meeting applicants' claimed structural limitations (*Tables 1 and 2; Figures; and claims 1 and 9*). Regarding the limitations "with different lattice constants" (claim 6), "wherein a lattice misfit ... is a value from 0.5% to 2.5%" (claim 10), "wherein said lattice misfit ... is a value from 0.5% to 1.5%" (claim 11), "wherein in a crystal lattice of said ferromagnetic metal layer ... within a plane of said ferromagnetic metal layer" (claim 12), and "wherein an axial length ratio a/b ... is within a range of 1.002 to 1.008" (claim 13), the Examiner notes that the claimed and prior art products are substantially identical in both structure and composition (*Table 1: Co-alloy magnetic*

layer over $CrMo_{20}$/Cr dual underlayer and Table 2: Co-alloy magnetic layer over $CrTa_{10}$/Cr dual underlayer) and, therefore, the Examiner deems that the above claimed limitations would have inherently been present in the prior art product for the reasons cited above.

However, even in the case where the claimed crystalline lattice properties may not be inherently present, the Examiner notes that it would have still been obvious to one of ordinary skill in the art to optimize the crystalline lattice properties to values meeting applicants' claimed limitations inorder to minimize lattice misfit (*as evidenced by Akimoto et al. – Paragraph 0079*) to improve the magnetic properties (*as evidenced by Bertero et al. – col. 4, lines 11 – 15, 40 – 44 and 59 – 67; col. 5, lines 5 – 9; col. 12, lines 48 – 57; col. 13, lines 50 – 59; col. 20, lines 36 – 41; col. 20, line 60 bridging col. 21, line 11; and Table 1*) including the squareness (*as evidenced by Howard – Figures 2A, 2B and 3; and col. 4, lines 3 – 6 and 41 - 55*).

Therefore, the Examiner deems that even in the case where the crystalline lattice properties may not inherently meet applicants' claimed limitations it would have still been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the lattice misfit and axial length ratio through routine experimentation, especially given the knowledge in the art noted above regarding the effect of the crystalline lattice properties on lattice misfit and the magnetic properties, including coercivity and squareness.

Regarding claim 17, Malhotra et al. disclose apparatus elements meeting applicants' claimed limitations (*col. 6, lines 1 – 8*).

Response to Arguments

7. The rejection of claims 1 – 13, 17, 19 and 20 under 35 U.S.C § 102(e)/103(a) – Malhotra et al. as evidenced by various prior art references

Applicant(s) argue(s) that neither Malhotra et al., nor any of the supporting evidentiary art, teach coercivity and Hk^{grain} values meeting applicants' claimed limitations, and therefore the rejections are not viable. The examiner respectfully disagrees.

The Examiner notes that the prior art structure: Cr/CrMo/Co-alloy magnetic layer possesses a substantially identical structure as that disclosed by applicants and Malhotra et al. disclose that the coercivity of such a structure meets the claimed coercivity limitations (*Table 1*). Therefore, the Examiner has met his burden of providing sound basis for the position of inherency and presently there is no evidence of record that the Malhotra et al. invention would not inherently meet applicants' claimed Hk^{grain} limitation. Furthermore, the Examiner notes that it is known in the art to optimize the Hk^{grain} value, as illustrated in the supporting evidentiary art cited above.

Finally, applicants argue that the large number of references indicate that the invention is both novel and non-obvious over the art. The Examiner respectfully disagrees.

In response to applicants' argument that the examiner has combined an excessive number of references, reliance on a large number of references in a rejection does not, without more, weigh against the obviousness of the claimed invention. See *In*

re Gorman, 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991). Specifically, the Examiner notes that the relied upon references are merely supporting references illustrating the that optimization of the various claimed parameters are clearly within the knowledge of one of ordinary skill.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

The Examiner acknowledges that applicants have perfected their claim for foreign priority and have, therefore, antedated the Maeda et al. evidentiary reference. However, the Examiner notes that since Maeda et al. was merely cited as one of several references to provide evidentiary support for the Examiner's basis of optimization, the grounds for rejection of claims 1, 2, 4 – 13, 17, 19 and 20 have not

been changed. As such this action has been made FINAL since the grounds of the rejection has not changed.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (703) 308-1737. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Thibodeau can be reached on (703) 308-2367. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

KMB
October 26, 2003

Paul Thibodeau
Supervisory Patent Examiner
Technology Center 1700